IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Norman L. Oberski et al.	Examiner:	Davienne N. Monbleau
Serial No.:	10/622,848	Group Art Unit:	2878
Filed:	July 18, 2003	Docket No.:	A126.113.102
Due Date:	**August 11, 2006**		
Title:	INSPECTION TOOL WITH A 3D POINT SENSOR TO DEVELOP A FOCUS MAP		

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION UNDER 37 C.F.R § 1.131

Sir/Madam:

This Declaration is submitted to establish prior invention of the subject matter of the instant patent application. The persons making this Declaration are both of the named inventors of the instant application, Norman L. Oberski and Mark R. Harless. We declare as follows:

1. We are residents of Minnesota and citizens of the United States.

2. We are the named inventors of the invention described and claimed in U.S. Pat. App. Ser. No. 10/622,848, entitled "Inspection Tool with a 3D Point Sensor to Develop a Focus Map," filed July 18, 2003 and claiming priority to Provisional Pat. App. Ser. No. 60/397,355, filed July 18, 2002.

3. This Declaration under 37 C.F.R § 1.131 is made in relation to prosecution of the instant application and more specifically in response to the grounds of rejection forwarded in the Office Action mailed on May 11, 2006, in which claims 1-21 were finally rejected. Claims 1, 2, 4, 5, 8, and 18 were rejected under 35 U.S.C. § 102(e) as being anticipated by McCord et al., U.S. Patent No. 6,597,006

("McCord"). Claims 6, 10-12, 14-17, 19, and 21 were rejected under 35 U.S.C. § 103(a) as being unpatentable over McCord. Claims 3, 9, 13, and 20 were rejected under 35 U.S.C. §103(a) as being unpatentable over McCord in view of Watanabe et al., U.S. Patent No. 6,107,637 ("Watanabe"). Claim 7 was rejected under 35 U.S.C. §103(a) as being unpatentable over McCord in view of O'Dell et al., U.S. Patent No. 6,324,298 ("O'Dell").

4. McCord et al., U.S. Patent No. 6,597,006 ("McCord") has a filing date of October 9, 2001.

5. Prior to the October 9, 2001 potential priority date of McCord, cited by the Examiner in all rejections as referenced above, we conceived of the above-identified and claimed invention. As factual evidence of our conception prior to the October 9, 2001 potential priority date of McCord, attached hereto and incorporated by reference herein, are Exhibits A-C.

6. Exhibit A (3 pages) is a copy of a redacted, confidential, and internal August Technologies presentation of a product planning proposal from July of 2001. The proposal relates, in part, to adding a 3D point sensor to an optical inspection system. On the first page (Exhibit A-1), concepts of using both confocal and laser z-height sensors for focusing are referenced for use in association with an optical inspection system, the NSX-95. On the second and third pages (Exhibit A-2, -3), the third and fourth quarters of 2001 are explicitly referenced, providing evidence of the July, 2001 timeframe of this presentation. In sum, this proposal describes and references subject matter related to the claimed invention of the present patent application, U.S. Pat. App. Ser. No. 10/622,848, which supports our assertion that we recognized and otherwise conceived of the described and claimed invention prior to the October 9, 2001 potential priority date of McCord.

7. Exhibit B (1 page) is a copy of a redacted, confidential, and internal August Technologies informational summary, entitled "Summary of Bare Wafer Inspection aka Unpatterened Substrate (UPS)." The informational summary was generated by me, Norman L. Oberski, in August 2001, as a personal planning tool for software changes for integrating a 3D point sensor into the NSX-95 inspection system. In sum, this informational summary describes and references subject matter related to the claimed invention of the present patent application, U.S. Pat. App. Ser. No. 10/622,848, which supports our assertion that we recognized and otherwise conceived of the described and claimed invention prior to the October 9, 2001 potential priority date of McCord.

8. Exhibit C (2 pages) is a copy of confidential and internal August Technologies notebook entry. The notebook entry was generated by me, Norman L. Oberski, on or about September 12, 2001, and includes information relating to testing 3D point sensor software and hardware. In sum, this notebook entry describes and references subject matter related to the claimed invention of the present patent application, U.S. Pat. App. Ser. No. 10/622,848, which supports our assertion that we recognized and otherwise conceived of the described and claimed invention prior to the October 9, 2001 potential priority date of McCord.

9. The claimed invention was constructively reduced to practice according to the filing of U.S. Provisional Pat. App. Ser. No. 60/397,355, filed July 18, 2002. The instant application, U.S. Pat. App. Ser. No. 10/622,848, claims benefit to that provisional application.

10. The invention was diligently reduced to practice from prior to the October 9, 2001 potential priority date of McCord as of at least the filing of U.S. Provisional Pat.

App. Ser. No. 60/397,355, filed July 18, 2002. Improvements and filing activities were undertaken during the period from prior to October 9, 2001 to July 18, 2002. As factual evidence of such diligence, attached hereto and incorporated by reference herein, are Exhibits D and E.

11. Exhibit D (1 page) is a copy of a redacted, confidential, and internal August Technologies presentation of a product planning proposal from January of 2002. The proposal relates, in part, to use of a 3D point sensor with an optical inspection system, the NSX-105. For example, the excerpted page references concepts including using z-height sensors for fast focus mapping in the NSX-105 system. In sum, this proposal describes and references subject matter of improvements related to the claimed invention of the present patent application, U.S. Pat. App. Ser. No. 10/622,848, which supports our assertion that the described and claimed invention was diligently reduced to practice from prior to the October 9, 2001 potential priority date of McCord.

12. Exhibit E (1 page) is a copy of a redacted, confidential, and internal software design document from May of 2002 authored by me, Norman L. Oberski. The excerpted page illustrates a control interface for using a 3D point sensor for focus mapping in association with the NSX-105 inspection system. In sum, this design document describes and references subject matter of improvements related to the claimed invention of the present patent application, U.S. Pat. App. Ser. No. 10/622,848, which supports our assertion that the described and claimed invention was diligently reduced to practice from prior to the October 9, 2001 potential priority date of McCord.

13. It is therefore respectfully submitted that the instant application describes and claims an invention which was conceived prior to October 9, 2001 and diligently

reduced to practice from prior to the October 9, 2001 potential priority date of McCord. Thus, McCord et al., U.S. Patent No. 6,597,006 ("McCord") should be removed as a reference under 35 U.S.C. §§ 102(e) and 103(a).

14. We further declare that all statements made herein of our own knowledge are true; that all statements made on information and belief are believed true; that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code; and that such willful false statements may jeopardize the validity of the application or patent issued thereon.

Norman L. Oberski — 9-Aug-2006 Date

Mark R. Harless — Date

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Norman L. Oberski — Date

Mark R. Harless — Date 8/9/06

Proposed Solution – Phase I

- Spartacus-1000
  - NSX-95
    - Z-Height sensor for focal plane
      - Confocal
      - Laser
    - Wafer pass/fail reporting (user defined threshold)
    - Able to inspect both active die and unpatterned substrate
    - 2mm edge exclusion
    - >1μm defect detection

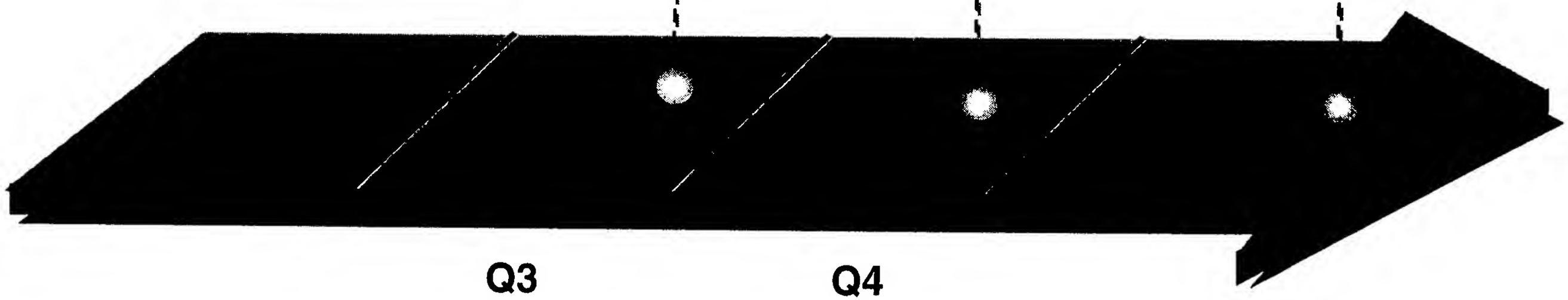
EXHIBIT A-1

Product Roadmap

Spartacus-1000
- Focus Method Solution
- > 1 Micron Defects
- Defect Reporting
  - Wafer Pass/Fail Only

Spartacus-1200
- < 1 Micron Defects
- Wafer Alignment
- Defect Location Reporting

Spartacus-1400
- High Throughput ~ 100 WPH (200mm)
- < 1 Micron Defects
- Multiple Lighting Options
  - Bright field
  - Dark Field
  - DIC



Q3 Q4

EXHIBIT A-2

Market Potential

- Spartacus-1000 (w/WHS)
  - ASP $[redacted]
- Spartacus-1200 (w/WHS)
  - ASP $[redacted]

- Q3 '01: 3-4 systems
  - $[redacted]
- Q4 '01: [redacted]
  - $[redacted]
- FY '02: [redacted]

EXHIBIT A-3

Summary of Bare Wafer Inspection
aka Unpatterned Substrate (UPS)

Intent

- allow generating focus map on bare, featureless wafers
- first phase – minimum functionality:
  - replace all optical focusing w/ laser sensor
  - some sort of calibration routine
  - sensor out-of-range simply causes focus failure
- subsequent development:
  - search for focus if out-of-range
  - "usable range" vs. "max range"
  - allow non-linear Z/voltage response

Sensor description

- probably a reflective laser thingy that reports ± displacement about a nominal working distance
- analog output of ± *(TBD)* volts corresponding to *(TBD)* mm measurement range
- V:mm plot is assumed linear within the measurement range
- will probably use an A/D converter card w/ DLL to read the sensor

Calibration issues

- sensor location is calibrated as an offset from objective #1 (highest mag, usu. 20X)
- other objectives (#2 - #5) also have an offset calibrated from objective #1
- sensor also has a "nominal z position" i.e. what z-axis location (referenced to obj. #1) puts the sensor at its optimal working distance? From this z location we can take sensor readings and be reasonably sure that we are within the sensor's measurement range.

Usage issues

- move from current location to sensor location:
  - offset x/y by the sensor's calibrated offset values
  - move z to the "nominal z position" minus the current objective's z offset
- get sensor reading in volts
- convert V to mm using linear formula based on votage range and measurement range
- calc focused position in mm for obj. #1
- convert that value into focused position for current objective

What's done

- basic FocusSensor design
- basic sensor setup dialog
- calibration routine simulated
- measurement routine simulated

EXHIBIT B

12 Sep 01

Laser Focus Sensor

μ-E (micro-epsilon)

~~In focus @ 20X~~

X	Y	Z	
-26.145	, Ø.Ø	, 5.184	Flat
-26.195	, -12.005	, 4.511	

HP GOLD wafer 0.673 mm thick?

	5.164
	4.519
Si Bare ½ wafer	0.645 mm thick?

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w/ 20X

Bare Si	0.875
	0.222
	0.648 mm thick

HP wafer	0.910
	0.226
	0.684 mm thick

EXHIBIT C-1

12 Sep 01

Force Sensor Cal. Debug

	x	y	z	
In force @ 20x :	-31.859	-33.752	0.914	
@ 0 w/ LFS :	~~38.765~~	~~23.092~~	~~15.855~~	= 2 Pos MM
	-32.933	23.505	15.853	= 2 Pos MM
offset:	~~6.906~~	~~56.844~~	~~14.9406~~	
	-1.074	57.257	14.939	

Mapping test

17 Jan 02

~~12V22~~

1)

2)

3)

4)

5)

6)

7)

8)

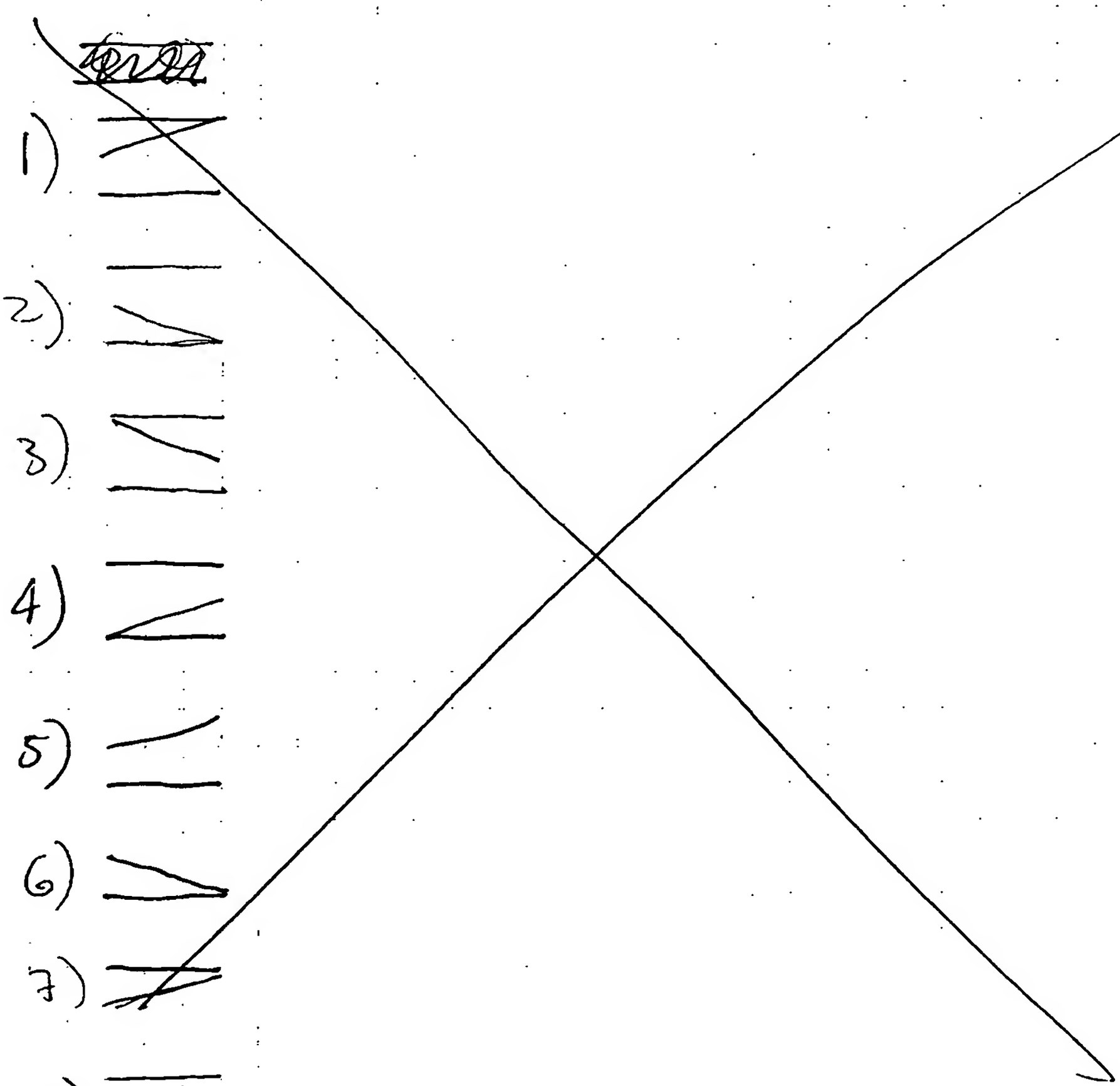


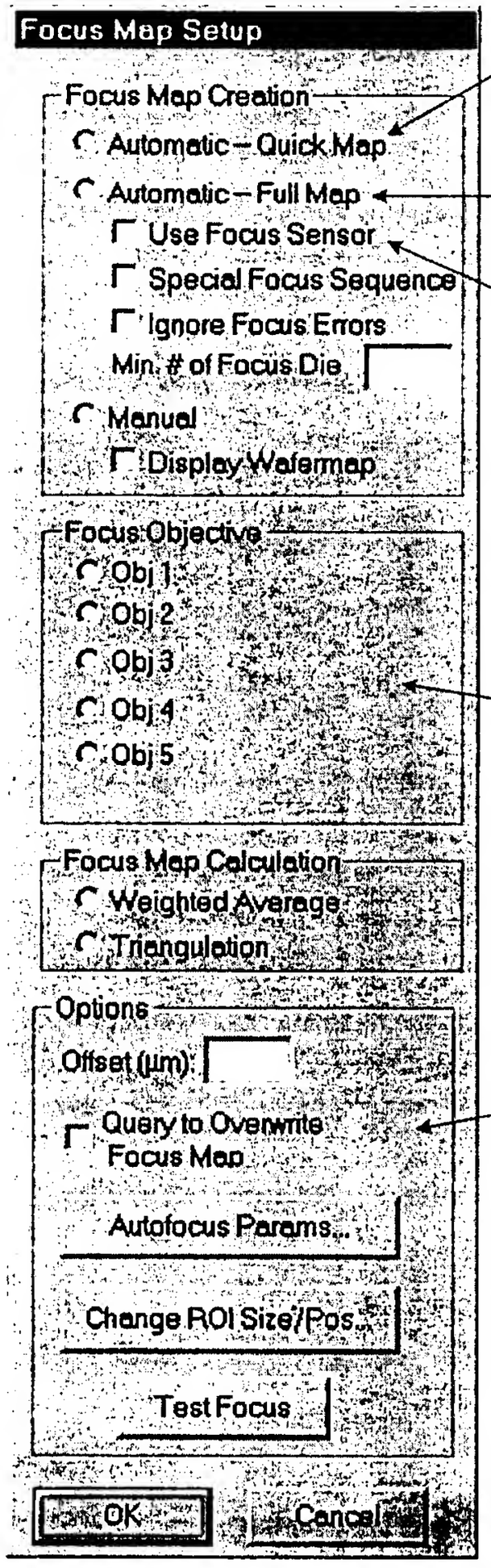
EXHIBIT C-2

NSX-105 Features

- ❒ **New Inspection Camera**
  - **1600 x 1200 30 FPS**
  - **Partial framing for image efficiency**
  - **Faster x scan velocity**
- ❒ **Optics**
  - **Universal optics**
  - **Flatter illumination**
  - **Better S/N**
  - **Larger pixel sizes, 7 to 10 um**
- ❒ **Fast Load & Align**
  - **Optional point sensor for fast focus maps**
  - **Dual end effector robot**
  - **Flat top plate technology**
  - **Optimize exchange, alignment, and focus times**
- ❒ **Stiffer frame**

EXHIBIT D

D168AutoFocusSetup Changes



New focus map option!
- This button is enabled when the point sensor is installed and the inspection mag is 1X or 2X
- Tells system to use the fast, low-mag load and align
- Focusing uses point sensor if installed, otherwise it uses selected objective
- Affects how other controls are displayed (see below)

This control's label has been changed from "Automatic"

New checkbox!
- This checkbox is enabled when point sensor is installed
- Tells system to use the continuous motion point sensor focus map generation
- Affects how other controls are displayed (see below)

Objective selection buttons are disabled when:
- "Quick Map" is selected and point sensor is installed
- "Full Map" and "Use Focus Sensor" are selected

If "Quick Map" is selected, all these controls are disabled.

If "Full Map" and "Use Focus Sensor" are selected and the inspection mag is >2x, the "Autofocus Params" and "Test Focus" buttons are disabled.

EXHIBIT E